

<b>Notice of Allowability</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/731,178	FOWLER ET AL.	
	Examiner Frederick F. Rosenberger	Art Unit 2884	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1.  This communication is responsive to 3 October 2005.
2.  The allowed claim(s) is/are 9-15 and 24-42.
3.  Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a)  All
  - b)  Some\*
  - c)  None
  1.  Certified copies of the priority documents have been received.
  2.  Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3.  Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4.  A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5.  CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.
  - (a)  including changes required by the Notice of Draftsperson's Patent Drawing Review ( PTO-948) attached
    - 1)  hereto or 2)  to Paper No./Mail Date \_\_\_\_\_.
  - (b)  including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6.  DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

#### Attachment(s)

1.  Notice of References Cited (PTO-892)
2.  Notice of Draftperson's Patent Drawing Review (PTO-948)
3.  Information Disclosure Statements (PTO-1449 or PTO/SB/08),  
Paper No./Mail Date \_\_\_\_\_
4.  Examiner's Comment Regarding Requirement for Deposit  
of Biological Material
5.  Notice of Informal Patent Application (PTO-152)
6.  Interview Summary (PTO-413),  
Paper No./Mail Date \_\_\_\_\_.
7.  Examiner's Amendment/Comment
8.  Examiner's Statement of Reasons for Allowance
9.  Other \_\_\_\_\_.

**DETAILED ACTION**

1. Applicant's amendment to the claims, filed 3 October 2005, in response to the Notice of Noncompliance has been received and entered. Applicant's amendment, filed 19 July 2005, has also been received and entered. Accordingly, claims 1-8 and 16-23 have been cancelled and claims 9-15 and 24-26 have been amended. Claims 9-15 and 24-42 remain pending in this application.
2. The drawings were received on 19 July 2005. These drawings are acceptable.
3. The amendment filed on 19 July 2005 has successfully overcome the objections to the specifications and drawings, as detailed in paragraphs 1-5 of the Office action mailed 26 May 2005.
4. The amendment to the claim 25 filed 3 October 2005 have successfully overcome the objection, as detailed in paragraph 6 of the Office action mailed 26 May 2005.

**EXAMINER'S AMENDMENT**

5. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

The application has been amended as follows:

Claim 10 (currently amended) wherein A survey instrument comprising:

- (a) a moderator;
- (b) a neutron detector, wherein:
  - (i) said moderator is substantially rectangular, and
  - (ii) dimensions of said moderator and material of said moderator and position of said neutron detector within said moderator are selected so that said neutron detector exhibits a neutron response that is about the same for fast and thermal neutrons;
- (c) at least four gamma ray detectors wherein
  - (i) each gamma ray detector comprises a scintillator and a light collecting device optically coupled to said scintillator, and
  - (ii) said gamma ray detectors are disposed within said moderator symmetrically around said neutron detector and with each at a corner of said moderator; and
- (d) a processor in which gamma ray responses from said gamma ray detectors are combined to yield
  - (i) intensity of gamma radiation impinging upon said survey instrument from a source, and
  - (ii) an indication of azimuthal direction of said source with respect to a reference on said survey instrument, wherein;

- (e) said indication of azimuthal direction comprises a ratio of responses of pairs of said gamma ray detectors;
- (f) intensity of gamma radiation comprises a sum of said responses of said gamma ray detectors
- (g) major axes of said gamma ray detectors are perpendicular to the major axes of said neutron detector; and
- (h) said ratio is used to determine said azimuthal direction.

***Allowable Subject Matter***

6. Claims 9-15 and 24-42 are allowed.
7. The following is an examiner's statement of reasons for allowance:

Independent claims 9, 10, 24, and 26 were previously indicated as allowable if written in independent form incorporating the limitations of the parent claims and any intervening claims. Restating those reasons for allowance,

Claim 9 is directed towards a survey instrument wherein a rectangular moderator has a neutron detector and at least four gamma ray detectors disposed symmetrically around the neutron detector at the corners of the moderator, wherein the major axes of the gamma ray detectors are oriented parallel to the major axis of the neutron detector, and a processor configured to determine direction of a source based on the responses of the gamma ray detectors. Claim 10 is directed towards a survey instrument wherein a rectangular moderator has a neutron detector and at least four gamma ray detectors

disposed symmetrically around the neutron detector at the corners of the moderator, wherein the major axes of the gamma ray detectors are oriented perpendicular to the major axis of the neutron detector, and a processor configured to determine direction of a source based on the responses of the gamma ray detectors. The prior art fails to teach or reasonably suggest the specific configuration of gamma ray detectors in a moderator around a neutron detector along with a processor for determining azimuthal direction of a source. Of the prior art of record, the only system including both a neutron detector and gamma ray detectors provides only source presence detection and thus does not include a processor for source location detection, wherein the direction is determined by the responses of the gamma ray detectors (see Fehlau).

Claim 24 is directed towards a method for measuring radiation with a survey instrument wherein the azimuthal direction of a source is determined via the responses of parallel oriented gamma ray detectors based on the combination of the ratio and sum data generated from the gamma ray detector responses. Claim 26 is directed towards a method for measuring radiation with a survey instrument wherein the azimuthal direction of a source is determined via the response of perpendicularly oriented gamma ray detectors based on the ratio of the data generated from the gamma ray detector responses. The prior art fails to teach or reasonably suggest using a sum and ratio or ratio of gamma detector responses for determining source direction. Prior art systems focus on a differential method (see Byrd) or ratio-based method (see Rubin) for determining source direction.

As such, applicant's disclosure provides a novel and nonobvious improvement over the prior art. Accordingly, the claims 9, 10, 24, and 26 would be allowable, along with their associated dependent claims.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

***Conclusion***

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Frederick F. Rosenberger whose telephone number is 571-272-6107. The examiner can normally be reached on Monday-Friday 8:00 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Porta can be reached on 571-272-2444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Frederick F. Rosenberger  
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